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EXAMINER

PHAM, THANHHA S

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/803,765

Applicant(s)

JOHN GRUNWALD

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-9 and 22-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9 and 22-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to Applicant's Amendment dated 04/08/2005.

Priority

1. Acknowledgment is made of applicant's claim for foreign priority based on an applications filed in Israel on 06/23/2002, 07/03/2002 and 07/24/2002. It is noted, however, that applicant has not filed certified copies of the 150364, 150577, and 150940 applications as required by 35 U.S.C. 119(b).

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Specification should be corrected to include as usage of a borane reducing agent and the reducing solution includes at least one metal ion of group 1b of the periodic table as being supported in the original claim 5.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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3. **Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.** The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is not clear which reducing agent comprising at least one metal ion of group Ib of the periodic table can reduce the non-precious metal ions to a lower oxidation state.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1, 3-9 and 22-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

► With respect to claim 1,

lines 10-12, "contacting the silicon wafer substrate with an electroless metal plating solution wherein the silicon wafer substrate is heated to an elevated temperature prior to during the electroless process" renders the claim indefinite. Limitation of "the electroless process" lacks antecedent basis. Moreover, "prior to during the electroless process" is unclear. It is not clear when the silicon wafer substrate is heated – prior to OR during the electroless process.

► With respect to claims 3 and 4,

"wherein at least one of steps is carried out by puddle process" renders the claim indefinite. It is not clear which step is considered as at least one of steps.

► With respect to claim 7,

"said deposited metal" lacks antecedent basis. It is not clear where "said deposited metal" comes from. Does "said deposited metal" refer to "non-precious metal" formed by steps (a) and (b) OR "said deposited metal" refer to metal deposited in step (2) by electroless metal plating?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1, 5-7, 24 and 26, as being best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Feldstein [US 4,339,476].

► With respect to claim 1 and 7, Feldstein (abstract and col. 1-13) discloses the claimed method of electrolessly depositing a metal of copper on at least a part of the surface of a silicon wafer substrate (glass substrate) comprising:

(1) providing nuclei comprising metal on the surface of the silicon wafer substrate (col. 2 lines 56-66 and col. 4 lines 49-61) by:

(a) contacting the silicon comprising wafer substrate with a solution comprising con-precious metal ions so as to obtained a wafer substrate covered with non-precious metal ions (col. 4 lines 63-68, col. 5 lines 1-4, col. 6 lines 15-19 & col. 6 lines 8-14); and thereafter

(b) exposing the wafer substrate obtained in step (a) to reducing solution comprising a reducing agent for reducing the non-precious metal ions that covered said substrate to a lower oxidation state (col. 6 lines 19-21 and col. 5 lines 7-16);

(2) contacting the silicon wafer substrate with electroless metal plating solution comprising copper wherein the silicon wafer substrate is heated to an elevated temperature during electrolessly depositing said metal of copper using said electroless metal plating solution comprising copper (col. 6 lines 22-23).

► With respect to claim 5, Feldstein (col. 3 lines 40-42, col 6 6 lines 59-67) shows said reducing solution in step (b) comprises borane reducing agent.

► With respect to claim 6, Feldstein (col. 6 lines 25-30, col 4 lines 64-67 and col 5 lines 1-4) shows using at least one metal ion of group Ib of the periodic table (copper ion) to provide said nuclei.

► With respect to claim 24, the heating of Feldstein (col. 4 lines 22-23) causes decomposition of the electroless metal plating solution (providing electroless plating copper).

► With respect to claim 26, Feldstein (col. 6 lines 8-23) shows only a selected portion of the silicon wafer substrate (immersed portion) is (a) contacted with the

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solution comprising non-precious metal ions, (b) exposed to a reducing solution, (c) contacted with an electroless metal plating solution and (d) heated to an elevated temperature.

6. Claim 27 is rejected under 35 U.S.C. 102(b) as being anticipated by Imura et al. [US 4,659,587].

Imura et al (figs 1-10's and col. 1-12) discloses the claimed method of electrolessly depositing as metal on at least a part of the surface of a silicon wafer substrate (silica workpiece, col. 1 lines 62-65) comprising:

(a) contacting the silicon wafer substrate with an electroless metal plating solution (fig 4, col 3 lines 61-65, col 4 lines 20-37 and col 9);

(b) selectively scanning the substrate while contacting with the electroless metal plating solution with a laser ;

such that decomposition of the electroless metal plating solution is caused by the laser (cols 2-4 and col. 9).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 3-4 and 22, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein [US 4,433,476] as applied to claim 1 above in view of Segawa et al. [US 6,638,564].

► With respect to claim 3-4, Feldstein substantially disclose the claimed method except teaching using puddle processing to carry out at least one of steps (a), (b) and (2) to provide solutions to the wafer substrate.

Segawa et al. teaches using puddle process as an improved process to supply chemical solution to the wafer substrate for electroless deposition with less wasting chemical.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process of Feldstein by using the puddle processing as being claimed, per taught by Segawa et al., to improve process of electroless deposition with low production cost wherein wasting of chemical being reduced.

► With respect to claim 22, in the combination process of Feldstein in view of Segawa et al, by using the puddle process in the process of Feldstein in view of Segawa et al, a puddle is formed on the surface of the silicon wafer substrate by containing the puddle with a wall around the periphery of the wafer (due to the spinning action of the puddle process).

8. Claims 8-9, 23 and 25, as being best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Feldstein [US 4,339,476] or Feldstein [US 4,339,476] in view of Segawa et al [US 6,638,564] as applied to claim 1 or 3 above in view of Imura et al. [US 4,659,587].

Feldstein and Feldstein in view of Segawa et al disclose the claimed method except teaching that heating is performed on a localized basis using a laser *[claim 23]* to cause decomposition of the electroless metal plating solution [claim 25] by scanning the wafer substrate with laser radiation during or after step (b) *[claims 8 and 9]* or during or after step (c) *[claim 9]* in predetermined manner.

However, Imura et al teaches scanning the wafer substrate with laser radiation for selective activation the wafer substrate for electroless deposition.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process of Feldstein or Feldstein in view of Segawa by selectively scanning the wafer substrate with laser radiation as being claimed, per taught by Imura et al, to provide a better control and efficiently electroless depositing metal of copper on the wafer substrate.

Double Patenting

9. Applicant is advised that should claim 3 be found allowable, claim 4 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Response to Arguments

10. Applicant's arguments with respect to claims 1, 3-9 and 22-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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